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# TO STUDY ON MRI BRAIN FINDINGS IN SEVERE PRE- ECLAMPSIA AND ECLAMPSIA IN PREGNANT WOMEN IN TERTIARY CARE CENTRE-A PROSPECTIVE OBSERVATIONAL STUDY

Obstetrics & Gynaecology

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## ABSTRACT

**Background:** To corroborate the clinical findings of severe pre-eclampsia and eclampsia patients with magnetic resonance imaging findings of brain. **Methods:** This is a 2-year prospective study was conducted in the VMGMC of department of obstetrics and gynaecology, Solapur. A sample size of 50 patients with severe pre- eclampsia/ eclampsia were included. Each patient was studied comparing under different variables to MRI brain findings. Comparison was done using appropriate statistical method to ascertain our findings statistical significance. **Results:** MRI revealed abnormal findings in 52% (26) of the patients, of that most common finding were bilateral PRES (40%), followed by hypoxic ischemic injury (4%), metabolic encephalopathy (2%), infarct (4%) and subacute infarct (2%). Among patients with abnormal MRI findings 4 of them belong to unregistered group and 22 of them are registered group, most of them are in younger age group of 21 to 25 years. Convulsions, eclampsia, consciousness level, systolic blood pressure, diastolic blood pressure, mean arterial pressure, haemoglobin level (p=0.05, p=0.012, p=0.001, p=0.002, p=0.019, p=0.007, p=0.027) respectively are in line with MRI findings. Age group, residence, socio economic level, parity status, gestational age, urine albumin level, mode of delivery, MgSO4 (p=0.364, p=1.00, p=0.235, p=0.120, p=0.162, p=0.721, p=0.611, p=0.749) respectively not in line with the MRI findings. **Conclusions:** Number of convulsions, type of eclampsia, consciousness level, systolic blood pressure, diastolic blood pressure, mean arterial pressure, haemoglobin level are statistically significant with MRI findings so, this findings in pregnant patients should arise concern and helps in plan of action for better management. Age group, residence, socio economic status, parity, gestational age, urine albumin level, mode of delivery RFT, and MgSo4 were not statistically significant for MRI findings.

## KEYWORDS

MRI Brain, Pre-Eclampsia, Convulsions, Pregnant Women.

## INTRODUCTION

Eclampsia is an acute neurological complication of preeclampsia characterized by convulsions and/or consciousness disorders which cannot be explained to another neurological disease in pregnancy. The incidence of eclampsia is around 1 in 2000 deliveries in developed countries and as high as around 1 in 100 to 1 in 1700 in developing countries.[1] Eclampsia is associated with an increased risk of maternal mortality in developed countries (0%-1.8%), but the mortality rate is as high as 15% in developing countries.[2] Among the morbidity factors, neurological involvement plays a major role.

The eclampsia was first described in 1881 by the discovery of cerebral hemorrhage in eclampsia.[3] Hypertensive disorders are one of the most common and serious and dreadful complications of pregnancy. Eclampsia and preeclampsia became a major cause of maternal and perinatal mortality and morbidity worldwide and they are life threatening multisystem disorder, which affects Cardiovascular, Hematological, Renal, Hepatic, and Central nervous system.[6]

Recent studies using computed tomography (CT) and magnetic resonance imaging (MRI) help to better understand brain lesions that occur during an convulsions. These lesions include intracerebral hemorrhage, cerebral ischemia, and cerebral edema, subacute and acute infarct.[4,5]

Present study is to identify the prevalence of neurovascular complications and neurovascular changes and involvement of different areas of brain (typical and atypical changes) in Eclampsia and preeclampsia a prospective observational study was conducted in Institute of Obstetrics and Gynaecology, Tertiary Care Center. MRI Brain was done for 50 patients of eclampsia and preeclampsia and the findings were analysed.

## AIM

- To study involvement of different areas of brain in severe preeclampsia and eclampsia in pregnant women

## OBJECTIVES

- To study and investigate the clinical parameters that are associated with the development of brain edema in patient with preeclampsia and eclampsia
- Distribution and nature of typical and atypical cranial imagining findings in severe preeclampsia and eclampsia.

## MATERIAL & METHODS

- This is 2 years prospective study was conducted in the department of obstetrics and gynecology in tertiary care hospital.
- Total of 50 women with severe preeclmapsia, eclampsia (antepartum and postpartum eclampsia)
- Women who are known case of hypertension, epilepsy, seizures due to metabolic distrubances, space occupying lesions, intracerebral infections and with CI of MRI were excluded from study.
- Detailed history were elicited and all patients were subjected to investigations like complete haemogram, Kidney function test, SGOT, SGPT, and fundoscopy.

### Inclusion Criteria

- All pregnant women in labour room diagnosed as severe preeclampsia and eclampsia who as advised MRI brain for medical and obstetrics emergency by faculty of obstetrics and gynaecology.

### Exclusion Criteria

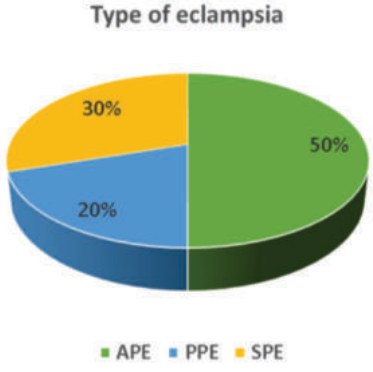
- Pregnancy <20wks
- Women with known case of hypertension, cardiac pacemakers, brain aneurysm clip, aorticclip, joint replacement.
- Patient with pre-existing neurological conditions-known case of epilepsy, demyelinating disorders, cerebrovascular accidents or neurosurgical disorders

## OBSERVATION AND RESULTS

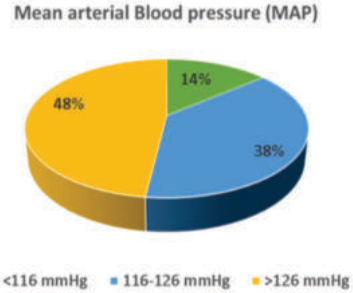
- A total of 50 women with eclampsia were included for the analysis. The mean age of study participants was 23 ±3.6 years with minimum and maximum age 19 and 35 years respectively. Most of the patients (64%) belonged to the age group of 21 to 25 years while 16% were aged more than 26 years.
- MRI findings shows that 50% of patients belonging to age group of 21 to 25 years had abnormal findings. While those in age group of less than 20 years 70% had abnormal findings and only 37% in age

group more than 26 years had abnormal MRI findings. But these findings were not statistically significant. (p=0.364)

- In the present study, 52% of patient belonged to urban area and 48% to rural. There was not significant association between residence and MRI findings.
- Most of the study participants belong to middle class family (46%). While 36% to the lower income group. No significant association of socioeconomic status and MRI finding. Around 62% of patients were primi with 38% being multipara. Parity status was not statistically associated with abnormal MRI findings (p=0.12).
- In present study, 38% and 36% of women belong to gestational age group of 29-36 weeks and 37-40 weeks respectively. Only 2% belong to less than 28 weeks. 24% of eclampsia patients were postpartum. Gestational age was not statistically associated with abnormal MRI findings (p=0.18). 30% of eclampsia patients had no convulsion in the present study. 26% and 24% had 3 and 2 convulsion respectively. Among those eclampsia patients with no convulsion, 80% had normal MRI findings. Presence of convulsions was statistically significantly associated with more abnormal MRI findings (p value = 0.05).
- APE was most commonly seen among 50% of patients followed by 30% of SPE and 20% of PPE. Those with APE and PPE had greater proportion of abnormal MRI finding when compared with those with SPE. There was statistically significant association between type of eclampsia and MRI finding (p=0.01).




- Most of the patients had FTCS (32%) followed by PTCS (28%), FTVD (22%) and PTVD (18%). There was statistically significant association between mode of delivery and MRI findings. (p= 0.67). 62% of eclampsia patient needed TICU admission with one patient with abruption and one death. 34% had no complication. Those with abnormal MRI findings greater proportion of complication which was statistically significant.
- Mental status assessed using GCS found 70% to be conscious with 22% and 8% being drowsy and unconscious respectively. Those with greater GCS score had greater proportion of MRI abnormality which was statistically Significant.
- The mean Systolic Blood pressure of the study participants was 159.4±16 mmHg. The mean Diastolic Blood pressure of the study participants was 110.6±12.8 mmHg. Those with greater SBP and DBP had greater proportion of abnormal MRI finding which was statistically significant. 48% had their MAP more than 126 mmHg. Those with greater MAP value had more MRI abnormality that was statistically significant.

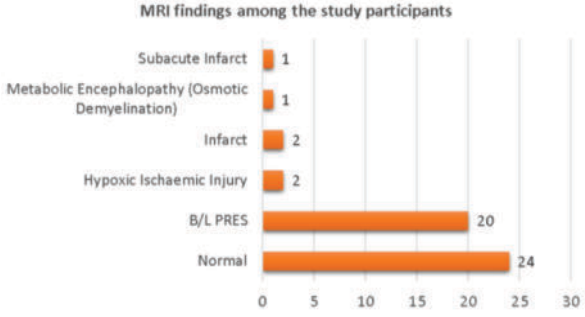



- In present study, 58% had normal fundus on examination. 34% and 8% had Grade 1 and 2 changes respectively. Fundal changes were associated with abnormal MRI findings which was statistically significant at p value=0.00.
- In present study, 78% of patients had a platelet count of less than 2 lakh. 20% and 2% had their count between 2-3 and more than 3 lakh respectively. There was no association between platelet count and MRI findings. (p=0.20)
- Most of the patients (68%) had a normal liver function test while 32% had altered LFT. The proportion of patients with altered LFT had more proportion of abnormal MRI findings which was found to be statistically significant with a p value =0.00.
- Most of the patients (92%) had a normal liver function test while only 8% had altered RFT. The proportion of patients with altered RFT had more proportion of abnormal MRI findings but it was not statistically significant with a p value = 0.61.
- In present study, 56% received the standard dose of magnesium sulphate while 44% received iv MgSO4. There was no association between use of MgSO4 and MRI findings.
- Most of the patients (68%) did not need antiepileptic drugs. Only 32% received levitracetam to treat eclampsia. Those treated with levitracetam had seizures and also abnormal MRI findings which was statistically significant with a p value 0.00.

Association between use of Antiepileptic and MRI findings

| Antiepileptic | | MRI findings | | Total |
|---|---|---|---|---|
| | | Normal (n=24) | Abnormal (n=26) | |
| No | Count | 24 | 10 | 34 |
| | % within group | 70.6% | 29.4% | 100.0% |
| | % within MRI findings | 100.0% | 38.5% | 68.0% |
| levitracetam | Count | 0 | 16 | 16 |
| | % within group | 0.0% | 100.0% | 100.0% |
| | % within MRI findings | 0.0% | 61.5% | 32.0% |

- Of the total 50 study participants with eclampsia 24 (48%) had a normal MRI finding will 26 (52%) had some abnormality in the MRI scan. Bilateral Posterior Reversible encephalopathy syndrome was the most common (40%) abnormality seen among those with abnormal MRI findings followed by Hypoxic Ischaemic Injury (4%), Infarct (4%) and 2% with metabolic encephalopathy and sub acute infarct.




- Among the 20 patients with PRES findings on MRI, Parietal area was involved in 40% of individual followed by front parietal occipital (20%), parieto occipital (35%) and basal ganglia (5%)..
- In the present study 40% were given mannitol and 60% did not require it. All those given mannitol had abnormal MRI findings which was statistically significant at p=0.000

## DISCUSSION

In our present study 50 women with eclampsia were selected according to the inclusion exclusion criteria and Magnetic Resonance and Imaging was done. The reports were analysed and studied.

Study done by Chakravarthy et al.,[7] age group varied from 24-30 years. Another study Junewar et al.,[8] found that most of the patients belonged to age group 20-29years. Similar, Results were observed in present study.

In our study group, 70% of patient had convulsions. All abnormal MRI findings patient has convulsions, presence of convulsion is statistically significantly associated with more abnormal MRI findings Comparable with study done by chakravarthy et al[7], junewar et al[8], almost all patient presented with convulsion or altered sensorium.

In our study group, 50% were APE, 30% SPE, 20% PPE. Those with APE and PPE had greater proportion of abnormal MRI findings when compared to SPE, which is statistically significant. Comparable with study done by chakravarthy et al[7], Junewar et al[8] most of the patient presented with convulsions.

In our study group, almost all patient had proteinuria. Those with higher grade of proteinuria had greater percentage of abnormal MRI findings. But proteinuria was not statistically associated with MRI findings. Comparable with study done by chakravarthy et al[7], almost all patient presented with proteinuria.

In our study, patient underwent FTCS (32%), followed by PTCS (28%), FTVD (22%) and PTVD (18%) Similarly, Study by Hall et al [9] found that 81.5% were delivered by caesarean section.

In our study, 62% of eclampsia patient needed TICU admission, 34% patient doesn't have any complications, 1 patient died (infarct), 1 abruption IUD, those with complications 75.8% have abnormal MRI findings which was statistically significant.

In our study group 70 % of the patients who are conscious had 31.4% of abnormal MRI findings. 22 % of the patients who are drowsy had 100% of abnormal MRI findings. 8% of the patient who are unconcious had 100% abnormal MRI findings. which was statistically significant. Among the patients with normal MRI finding, 0% were unconscious,68.6% were conscious. Comparable with study done by chakravarthy et al[7], junewar et al[8] almost all patient presented with altered sensorium.

In our study group, Patients with systolic blood pressure ranging from >160mm Hg,84.2% have abnormal MRI finding,15.8% have normal MRI finding. Comparable with study done by chakravarthy et al[7], almost all patient systolic Blood pressure >140mm Hg

In our study group, the patients with diastolic blood pressures>110mmHg have 76.5% abnormal MRI finding and 23.5% of normal finding. p value is 0.019 which is statistically significant. Comparable with study done by chakravarthy et al[7], almost all patient presented with blood pressure >100mm Hg

In our study group, the patients with Mean arterial pressure>126 mmHg, have 75% of abnormal MRI findings and 25% of normal MRI findings. which is statistically significant.

In our study group, Out of 50 Eclampsia patients, 24 patients had normal MRI finding. 20 patients are diagnosed a shaving Posterior Reversible Encephalopathy syndrome.2 patients had Hypoxic ischaemic injury, 2 patient had Right temporal infarct, 1 patient had metabolic Encephalopathy (osmotic demelination). 1 patient had subacute infarct. In the study done by chakravarthy et al[7] all patients(n=8) had cerebral odema,3 patients had cerebral hemmorhage (37%). Another study done by Moodley et al [10] (1993), the most common finding was cerebral edema

In our study, out of 50 patients 20 (40%) patients were treated with injection mannitol, patient who had abnormal MRI findings were treated with injection Mannitol and followup study done, patient improved clinically and radiologically with injection mannitol.

## CONCLUSION

Almost 70% of the Eclampsia patients had pathological abnormalities detected through MRI scan of Brain. Altered sensorium, visual disturbances, presentation with status epilepticus and altered liver function and renal function test are more likely to be associated with abnormal neuroimaging findings. Posterior Reversible Ence phalopathy Syndrome was the most common pathological abnormality detected. The next common is the Hypoxic ischaemic injury and infarct. Magnetic resonance imaging with shows early characteristics findings that precede the more classic clinical presentation of eclampsia hence MRI brain should be included in the investigation protocol for Eclampsia if not for all, at least for those patients with complications. Almost all patients with abnormal MRI findings were treated with injection mannitol and injection levitracetam, which results in clinical improvement. Hence concluded to include injection mannitol and injection levitracetam in patient with status eclampticus and abnormal MRI findings

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